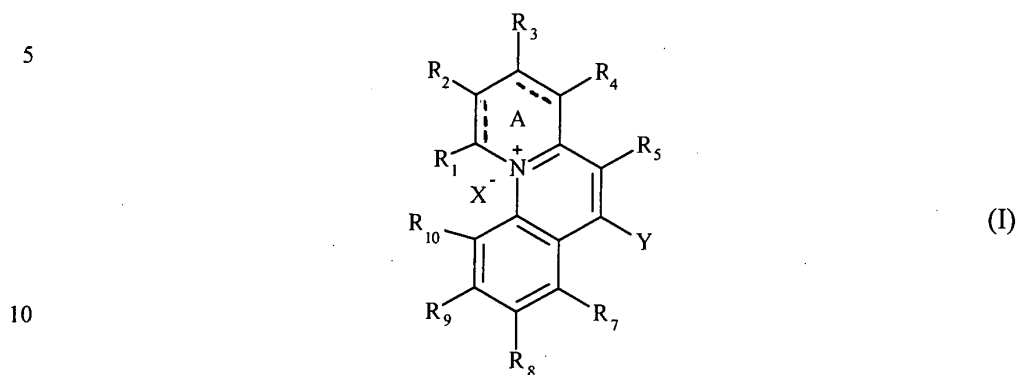


## CLAIMS

1. Use of derivatives of the following general formula (I):



in which:

15 - the heterocycle A is aromatic or non-aromatic, it being understood that in this latter case the nitrogen atom of this heterocycle is linked by a double bond to the carbon in position 4a,

- R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub>, R<sub>4</sub>, R<sub>5</sub>, R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>10</sub>, represent, independently of one another:

- 20 . a hydrogen atom, or
- . a halogen atom, in particular a chlorine, bromine, or fluorine atom, or
- . an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, linear or branched, with approximately 1 to approximately 10 carbon atoms, these groups being if appropriate substituted, in particular by a halogen, and/or by a hydroxyl, and/or by a (primary, secondary or tertiary) amine, and/or by an aromatic and/or
- 25 aliphatic ring, with approximately 5 to approximately 10 carbon atoms in the ring, these rings being themselves, if appropriate, substituted in particular by a halogen, and/or by a hydroxyl, and/or by a (primary, secondary or tertiary) amine, and/or by an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, these groups being as defined above, or
- 30 . an aromatic or aliphatic ring, with approximately 5 to approximately 10 carbon atoms in the ring, this ring being itself, if appropriate, substituted in particular by a halogen, and/or by a hydroxyl, and/or by a (primary, secondary or

tertiary) amine, and/or by an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, these groups being as defined above, or

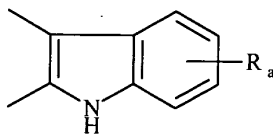
5 . an  $-OR_a$  group,  $R_a$  representing a hydrogen atom, or an alkyl, carbonyl, oxycarbonyl or ester group, linear or branched, these groups being as defined above, or an aromatic or aliphatic ring, these rings being as defined above, or

. an  $-NR_bR_c$  group,  $R_b$  and  $R_c$ , independently of one another, representing a hydrogen atom, an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, linear or branched, these groups being as defined above, or an aromatic or aliphatic ring, these rings being as defined above, or

10 . when  $R_1$  and  $R_2$ , and/or  $R_3$  and  $R_4$ , and/or  $R_4$  and  $R_5$ , and/or  $R_7$  and  $R_8$ , and/or  $R_8$  and  $R_9$ , and/or  $R_9$  and  $R_{10}$ , do not represent the different atoms or groups or rings mentioned above, then  $R_1$  in combination with  $R_2$ , and/or  $R_2$  in combination with  $R_3$ , and/or  $R_3$  in combination with  $R_4$ , and/or  $R_4$  in combination with  $R_5$ , and/or  $R_7$  in combination with  $R_8$ , and/or  $R_8$  in combination with  $R_9$ , and/or  $R_9$  in combination with  $R_{10}$ , respectively form with  
15  $C_1$  and  $C_2$ , or with  $C_2$  and  $C_3$ , or with  $C_3$  and  $C_4$ , or with  $C_4$ ,  $C_{4a}$  and  $C_5$ , or with  $C_7$  and  $C_8$ , or with  $C_8$  and  $C_9$ , or with  $C_9$  and  $C_{10}$ , an aromatic or aliphatic ring with 5 to 10 carbon atoms, this ring being if appropriate substituted, in particular by a halogen, and/or by an alkyl, alkoxy, carbonyl, oxycarbonyl, or ester  
20 group, and/or by an aromatic or aliphatic ring, these groups or rings being as defined above, or

. when  $R_3$  and  $R_4$  do not represent the different atoms or groups or rings mentioned above, then  $R_3$  in combination with  $R_4$  forms an indole group of formula

25



in which  $R_a$  is as defined above,

30

- Y represents:

. an -OR<sub>d</sub> group, R<sub>d</sub> representing a hydrogen atom, or an alkyl, carbonyl, oxycarbonyl or ester group, linear or branched, these groups being as defined above, or an aromatic or aliphatic ring, these rings being as defined above, or

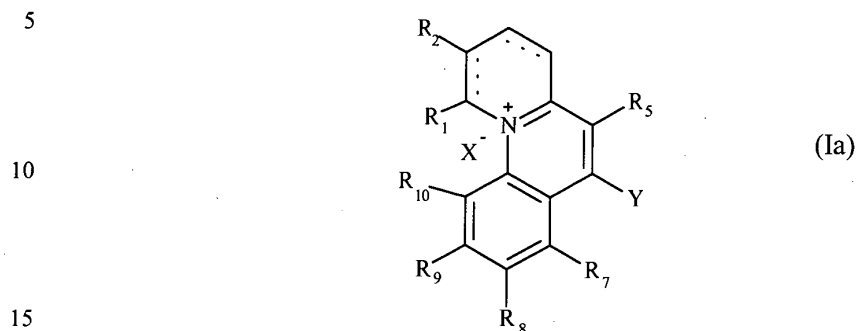
5 . an -NR<sub>e</sub>R<sub>f</sub> group, R<sub>e</sub> and R<sub>f</sub> independently of one another, representing a hydrogen atom, or an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, linear or branched, these groups being as defined above, or an aromatic or aliphatic ring, these rings being as defined above,

10 . it being understood that when R<sub>d</sub>, or at least one of R<sub>e</sub> or R<sub>f</sub>, do not represent one of the different atoms or groups or rings mentioned above, then R<sub>d</sub>, or at least one of R<sub>e</sub> or R<sub>f</sub>, in combination with R<sub>5</sub>, or in combination with R<sub>7</sub>, respectively form with C<sub>5</sub> and C<sub>6</sub>, or with C<sub>6</sub>, C<sub>6a</sub> and C<sub>7</sub>, an aromatic or aliphatic heterocycle with 5 to 10 carbon atoms, if appropriate substituted, in particular by a halogen, and/or by an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, and/or by an aromatic or aliphatic ring, these groups or rings being as defined above,

15 - X represents an atom in anionic form, such as a halogen atom, in particular a bromine or chlorine atom, or a group of atoms in anionic form, such as a perchlorate, and the nitrogen of the heterocycle A of formula (I) is in quaternary form and is linked on the one hand by a covalent bond to the carbon in position  
20 11, and, on the other hand, by ionic bond to X defined above, it being understood that when R<sub>1</sub> and R<sub>10</sub> do not represent one of the different atoms or groups or rings mentioned above, then R<sub>1</sub> in combination with R<sub>10</sub> forms with C<sub>1</sub>, the nitrogen of the heterocycle A of formula (I), C<sub>11</sub>, and C<sub>10</sub>, an aromatic or aliphatic heterocycle with 5 to 10 carbon atoms, if appropriate substituted, in  
25 particular by a halogen, and/or by an alkyl, alkoxy, carbonyl, oxycarbonyl or ester group, and/or by an aromatic or aliphatic ring, these groups or rings being as defined above,

30 for the preparation of medicaments intended for the treatment of pathologies linked to a constriction of smooth muscle cells in tissues such as the pathologies linked to vasoconstriction phenomena within the scope of vascular disorders, in particular arterial hypertension, or the pathologies linked to bronchoconstriction phenomena within the scope of respiratory disorders, in particular asthma.

2. Use according to claim 1, of the derivatives of benzo[c] quinoliziniums of following formula (Ia):



in which:

- R<sub>1</sub> and R<sub>2</sub> represent a hydrogen atom, or form in combination with C<sub>1</sub> and C<sub>2</sub> an aromatic ring with 6 carbon atoms,

20 - R<sub>5</sub> represents a hydrogen atom, or a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular a butyl group, or an ester of formula COOR' in which R' represents a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular an ethyl group,

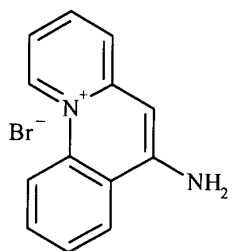
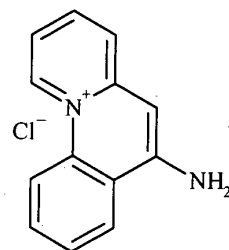
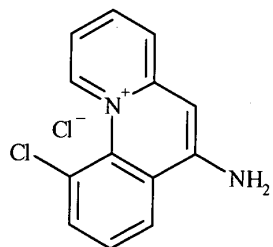
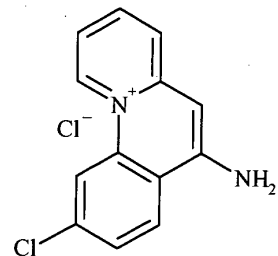
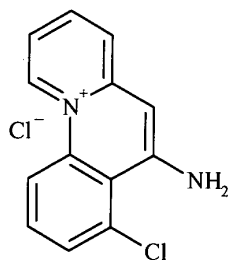
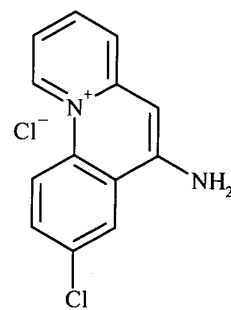
- Y represents an -OH, -SH, -NH<sub>2</sub>, or -NHCOCH<sub>3</sub> group,

25 - R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>10</sub> represent a hydrogen atom, or at least one of R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> or R<sub>10</sub>, represents a halogen atom, in particular a chlorine, bromine or fluorine atom,

- X represents a halogen atom in anionic form, in particular a bromine Br<sup>-</sup>, or chlorine Cl<sup>-</sup> atom, or a group of atoms in anionic form.

30 3. Use according to claim 1 or 2, of the derivatives of benzo[c] quinoliziniums of formula (Ia) in which Y represents an -NH<sub>2</sub>, or -NHCOCH<sub>3</sub> group.

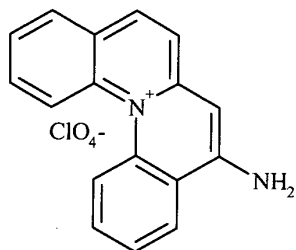
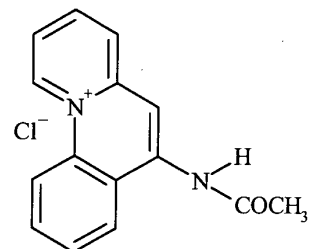
35 4. Use according to claim 3, of the following derivatives of benzo[c]quinoliziniums of formula (Ia):

**compound 13 (MPB-01)****compound 11 (MPB-26)****compound 14 (MPB-02)****compound 15 (MPB-03)****compound 16****compound 17**

**compound 22**

5

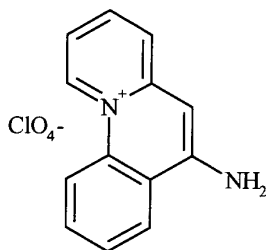
10

**compound 23****compound 24**

15

20

25



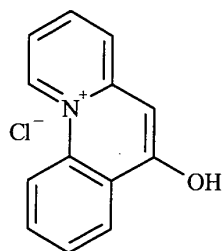
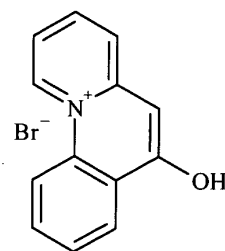
5. Use according to claim 1 or 2, of derivatives of the benzo[c]quinoliziniums of formula (Ia) in which Y represents OH.

6. Use according to claim 5, of derivatives of the benzo[c]quinoliziniums of formula (Ia) chosen from the following:

**compound 12 (MPB-05)**

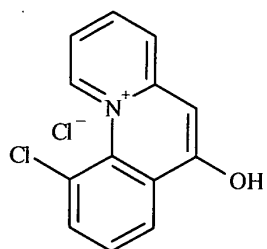
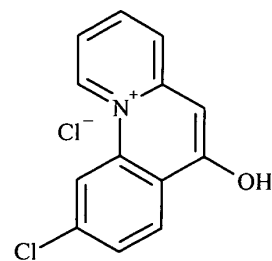
35

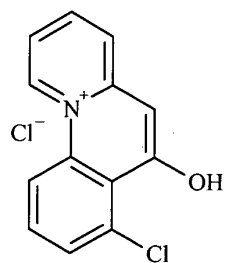
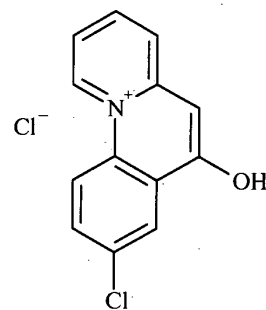
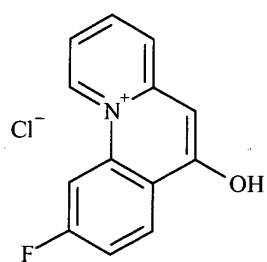
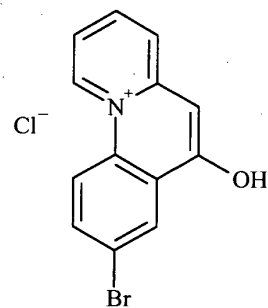
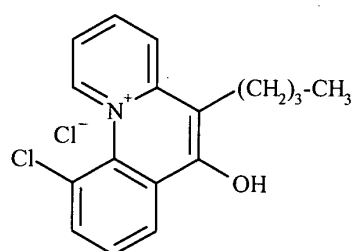
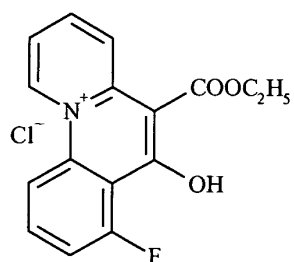
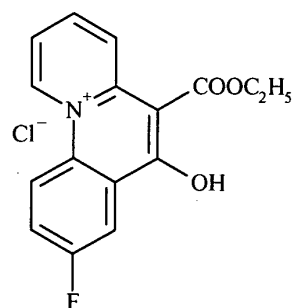
40

**compound 18 (MPB-06)****compound 19 (MPB-07)**

45

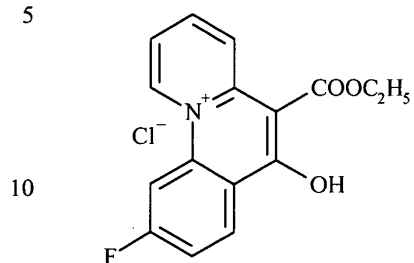
50

**compound 20 (MPB-08)**

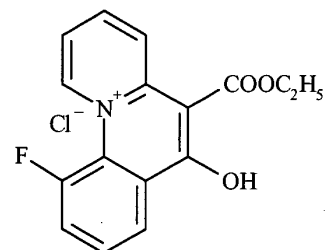
**compound 21 (MPB-27)****compound 25 (MPB-30)****compound 26 (MPB-29)****compound 27 (MPB-32)****compound MPB-91****compound MPB 73****compound MPB 75**

**compound MPB 86**

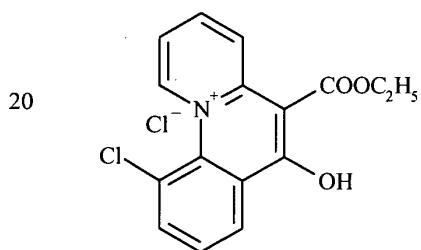
5



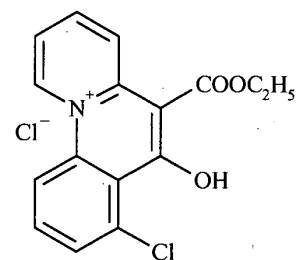
10

**compound MPB 77****compound MPB 87**

15



20

**compound MPB 88**

25

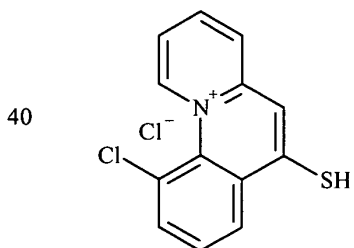
7. Use according to claim 1 or 2, of derivatives of the benzo[c]quinoliziniums of formula (Ia) in which Y represents SH.

30

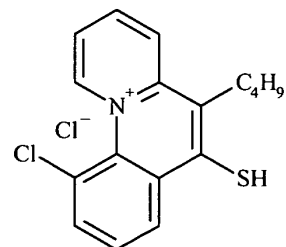
8. Use according to claim 7, of derivatives of the benzo[c]quinoliziniums of formula (Ia) chosen from the following:

**compound MPB 102**

35

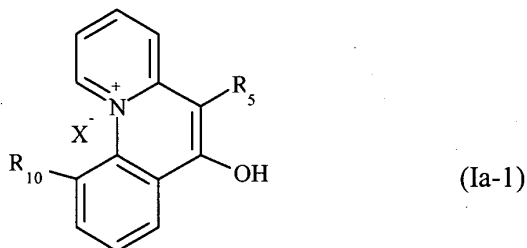


40

**compound MPB 103**



9. Use according to claim 5, of derivatives of the following general formula (Ia-1):



in which:

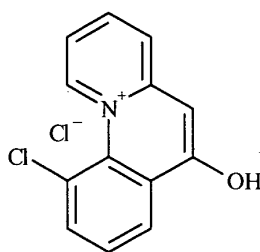
- R<sub>5</sub> represents a hydrogen atom, or a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular a butyl group,

- R<sub>10</sub> represents a halogen atom, in particular a chlorine, bromine or fluorine atom,

- X represents a halogen atom in anionic form, in particular a bromine Br<sup>-</sup> or chlorine Cl<sup>-</sup> atom, or a group of atoms in anionic form, in particular a perchlorate ClO<sub>4</sub><sup>-</sup>.

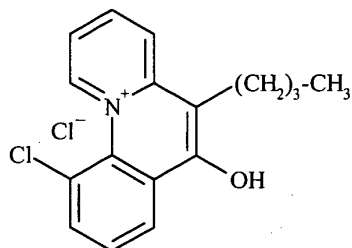
10. Use according to claim 9, of the derivative MPB-07 of following formula:

**compound 19 (MPB-07)**

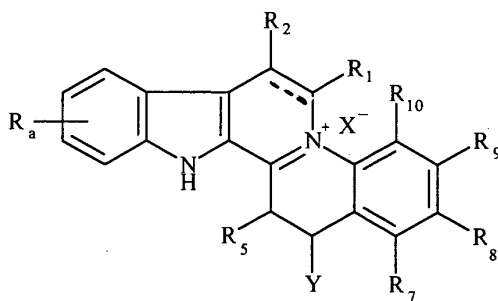


11. Use according to claim 9, of the derivative MPB-91 of following formula:

## compound MPB-91



12. Use according to claim 1, of derivatives of following general formula (Ib):

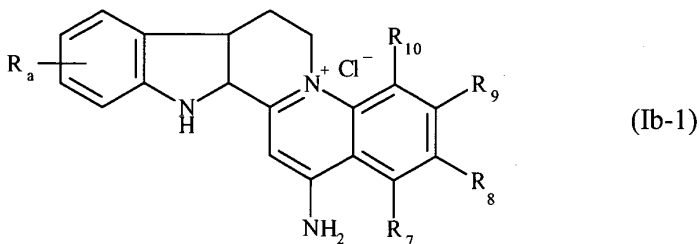


(Ib)

in which  $R_a$ ,  $R_1$ ,  $R_2$ ,  $R_5$ ,  $R_7$ ,  $R_8$ ,  $R_9$ ,  $R_{10}$ ,  $X$  and  $Y$  are as defined in claim 1, and in particular the compounds of formula (Ib) in which:

- $R_a$  represents a hydrogen atom,
- $R_1$  and  $R_2$  represent a hydrogen atom, and there is no double bond between the two carbons carrying  $R_1$  and  $R_2$ ,
- $R_5$  represents a hydrogen atom,
- $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{10}$  represent a hydrogen atom, or one of  $R_7$ ,  $R_8$ ,  $R_9$  or  $R_{10}$  represents a halogen atom, in particular a chlorine, bromine or fluorine atom,
- $Y$  represents  $NH_2$ ,
- $X$  represents a halogen atom, in particular a bromine, or chlorine, or fluorine atom.

13. Use according to claim 10, of derivatives of following formula (Ib-1):



and more particularly the following compounds of formula (Ib-1):

- compound G :  $R_7 = \text{Cl}$ ,  $R_8 = R_9 = R_{10} = \text{H}$ ,
- compound H :  $R_7 = R_8 = R_9 = R_{10} = \text{H}$ ,
- 15 - compound I :  $R_8 = \text{Cl}$ ,  $R_7 = R_9 = R_{10} = \text{H}$ ,
- compound J :  $R_9 = \text{Cl}$ ,  $R_7 = R_8 = R_{10} = \text{H}$ ,
- compound K :  $R_{10} = \text{Cl}$ ,  $R_7 = R_8 = R_9 = \text{H}$ ,
- compound L :  $R_9 = \text{Br}$ ,  $R_7 = R_8 = R_{10} = \text{H}$ .

20 14. Compounds of formula (I) as defined in claim 1 in which  $R_5$  represents an ester of formula  $\text{COOR}'$  in which  $R'$  represents a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular an ethyl group.

25 15. Compounds according to claim 14, of formula (Ia) as defined in claim 2, in which:

- $R_1$  and  $R_2$  represent a hydrogen atom, or form in combination with  $C_1$  and  $C_2$  an aromatic ring with 6 carbon atoms,
- $R_5$  represents an ester of formula  $\text{COOR}'$  in which  $R'$  represents a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular an ethyl group,
- 30 -  $Y$  represents an  $-\text{OH}$ ,  $-\text{SH}$ ,  $-\text{NH}_2$ , or  $-\text{NHCOCH}_3$  group,
- $R_7$ ,  $R_8$ ,  $R_9$  and  $R_{10}$  represent a hydrogen atom, or at least one of  $R_7$ ,  $R_8$ ,  $R_9$  or  $R_{10}$  represents a halogen atom, in particular a chlorine, bromine or fluorine atom,
- $X$  represents a halogen atom in anionic form, in particular a bromine  $\text{Br}^-$ ,
- 35 or chlorine  $\text{Cl}^-$  atom, or a group of atoms in anionic form.

16. Compounds according to claim 14 or 15, of formula (Ia) in which  $R_5$  represents an ester of formula  $\text{COOR}'$  in which  $R'$  represents a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular an ethyl group, and  $Y$  represents an  $-\text{OH}$  group.

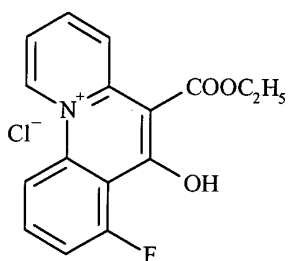
5

17. Compounds according to one of claims 14 to 16, of following formulae:

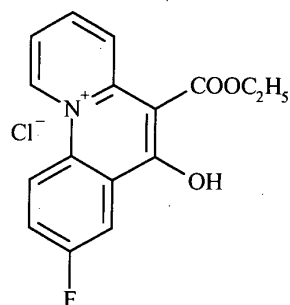
**compound MPB 73**

10

15



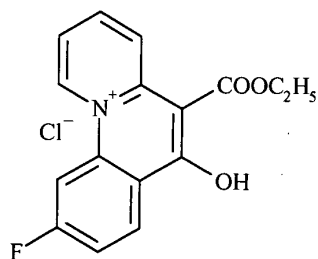
**compound MPB 75**



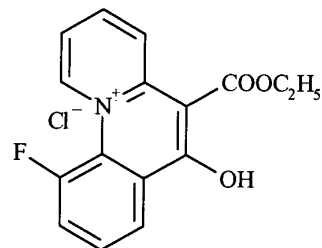
**compound MPB 86**

20

25



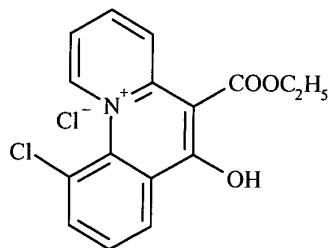
**compound MPB 77**



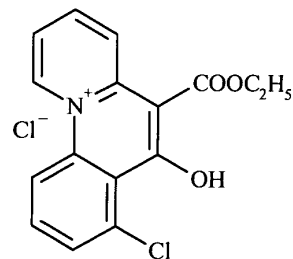
**compound MPB 87**

30

35



**compound MPB 88**



18. Compounds of formula (I) as defined in claim 1 in which  $Y$  represents

40

$\text{SH}$ .

19. Compounds according to claim 18, of formula (Ia) as defined in claim 2, in which:

- R<sub>1</sub> and R<sub>2</sub> represent a hydrogen atom, or form in combination with C<sub>1</sub> and C<sub>2</sub> an aromatic ring with 6 carbon atoms,

- R<sub>5</sub> represents a hydrogen atom, or a linear or substituted alkyl group with 1 to 10 carbon atoms, in particular a butyl group,

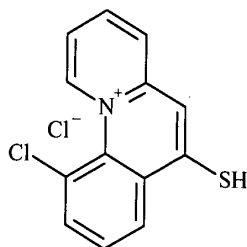
- Y represents an -SH group,

- R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> and R<sub>10</sub> represent a hydrogen atom, or at least one of R<sub>7</sub>, R<sub>8</sub>, R<sub>9</sub> or R<sub>10</sub> represents a halogen atom, in particular a chlorine, bromine or fluorine atom,

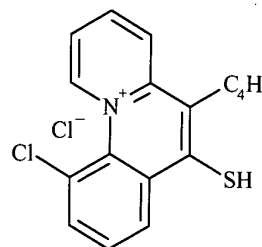
- X represents a halogen atom in anionic form, in particular a bromine Br<sup>-</sup>, or chlorine Cl<sup>-</sup> atom, or a group of atoms in anionic form.

20. Compounds according to claim 18 or 19, of following formulae:

**compound MPB 102**



**compound MPB 103**



21. Pharmaceutical compositions comprising at least one compound defined in one of claims 14 to 20, in combination with a pharmaceutically acceptable vehicle.